Telecommunications and Public Sector Use

The public sector is an extensive user and purchaser of telecommunications services. It also operates important telecommunications networks and provides telecommunications services to users outside of state government. The quality of telecommunications greatly impacts the activities of the public sector, and the public sector also shapes the telecommunications landscape in its role as user, operator, and purchaser in addition to its roles as regulator and policy-maker.

GOALS

The policies and actions set forth in this section of the plan are guided by four overarching goals for the state as a builder and buyer of telecommunications networks and services. In this role, state government should seek to:

▶ Obtain low cost, high quality, easily managed telecommunications services to meet the needs of state government;

▶ Support the ability of state, local, federal agencies, and related public-interest institutions to communicate with each other easily with appropriate technology;

▶ Apply innovative but proven technology to improve the efficiency of state government and the quality of services offered to the public; and

▶ Support the development of high-quality, high-value telecommunications networks and services to the residents, businesses, and institutions throughout Vermont.

PUBLIC-INTEREST TELECOM NETWORKS

The state operates and contracts for a variety of telecommunications networks either on an owned or leased basis, including GOVnet/K12net and the Public Safety network. The networks operated by the Department of Public Safety (DPS) and the Department of Information and Innovation (DII) serve the range of state agencies. In addition to state government users, they serve to a certain extent local public sector and other users, such as local schools and local emergency responders. Greater integration of telecommunications networks across the public sector in Vermont is important to realizing the greatest value for the state's communications dollar. Finally, there are categories of users outside of state government to which state government does not traditionally provide telecommunications services but in which the state has an important public interest. For example, important aspects of the Department of Health's public health mission are compromised when small health care providers are not connected and using electronic public health care databases. Examples of users extend from health care providers to underserved rural communities. While the state may not necessarily play the same role in ensuring telecommunications services

to these "public-interest" users, the state must be mindful of the ways that its actions in purchasing or building telecommunications networks can positively or negatively affect them.

The year 2003 saw significant positive movement toward the management of telecommunications and information technology in state government on an enterprise-wide basis with the creation of the new Department of Information and Innovation. As this first stage of reorganization and integration takes hold, it is appropriate to look at ways that the integration of state government telecommunications can be further extended. While the DII has consolidated the purchasing of state voice lines and GOVnet data links, significant pieces of state government telecommunications have not yet been integrated. The most obvious example is the state public safety network, which provides voice, data, and mobile communications capability. The DPS operates it, and the State Police and Emergency Management are its most mission-critical users. Still, only about half of the usage on the network is DPS usage. The DPS provides service to dozens of organizations, among the largest are the Agencies of Natural Resources, Transportation, and Human Services. The upgraded microwave network was designed with capacity to handle traffic beyond that which the DPS is likely to use, at least in the near future. Not only does the DPS share its network with other users, it also relies on payment from those users to offset the costs of operating the network. It is obvious that the state must have a public safety communications system and that in providing that system there is the opportunity to provide for the communications needs of other users. With state government providing two major voice and data communications options, it makes sense that state government should manage use of these options (and funding for them) on the basis of what best meets the needs of the whole enterprise.

Other examples of state telecommunications links include the various short-haul point-to-point wireless links being implemented by various state agencies. This type of high-speed link, often operating in a license-exempt band, can connect locations such as two buildings within town using a pair of small fixed antennas. This can be a relatively inexpensive way to extend the reach of a Local Area Network (LAN) with a multi-megabit connection. This type of link can be a low-cost, quick-setup solution and perfectly appropriate. There are possible downsides as well to state agencies deploying these links if they were to be deployed in a completely ad-hoc manner. One possibility is the potential for interference. Since these devices often operate in unlicensed radio bands (like cordless phones or Wi-Fi transmitters), a large number of devices operating within a small area (such as the capitol complex in Montpelier or the state campus in Waterbury) could result in the devices causing interference with each other. Skilled planning can reduce the likelihood of this happening. The other downside is the possibility of lost opportunities. Use of these devices in an ad-hoc manner can obscure the true level of demand and usage at state facilities. There may be opportunities for different state users to combine usage over links in ways that lower cost or improve performance or reliability. With a level of common oversight and planning these opportunities can be realized. DII has developed an inventory of these links and is working with a wireless planning and engineering firm to better manage the interactions between them.

The presence of a variety of types of telecommunications networks in state government—the DPS-owned and operated microwave network, the ad-hoc point-to-point wireless links, and the GOVnet and Centrex voice system, leased from providers like Telcove and Verizon—illustrate the "buy vs. build" question. Is it better for the state to have control over its own communications facilities or to lease services from commercial carriers? The answer depends heavily on a variety of factors that vary in specific situations including cost, reliability, support, availability of service, level of in-house expertise, and funding constraints. Regardless of whether the state builds or buys, its decision will have greater positive impact beyond state users (and possibly for state users as well) if it is able to share. Sharing communications capacity can take a variety of forms including buying in conjunction with other users, negotiating for better service on behalf of not only the state government, but the public, sharing bandwidth or facilities with other users or carriers who serve the public, and acting as an "anchor customer" to help justify the case for new investment that will serve multiple users. If sharing can be good, sharing widely can be better. Sharing only among a few categories of favored users can make those users who are not privileged less attractive to service providers, especially in rural communities. Sharing is not appropriate or possible all of the time, but it deserves support. The state is likely to continue to serve its needs through a combination of owned and leased facilities and equipment, but if it can share telecommunications service or facilities with a wide spectrum of other users the state will gain an important tool in developing the state's telecommunications future.

Policies

▶ In budgeting for and funding state communications systems, facilities and services used for law enforcement, emergency response, emergency management, and public health threat response should be especially high priorities.

▶ When examining its options for providing voice and data services to state government agencies, the DII should examine both state-operated networks and facilities (especially pre-existing ones like the DPS microwave network). The DII should seek to manage the communications services provided and costs incurred across the entire state government enterprise.

Strategies/Action Plans

▶ State agencies should register new point-to-point wireless links with the DII.

▶ The DPS should consult with DII on planning and implementation of all major telecommunications projects, initiatives, and interagency service arrangements and ensure that these are consistent with state government enterprise-wide telecommunications policies and objectives.

STATE DATA AND VIDEO COMMUNICATIONS

It has been at least five years since most of the major state telecommunications contracts for data telecommunications services have been put out to bid. Much has changed in the intervening period. Services available have evolved, prevailing prices have changed and the state has completed a major upgrade to the backbone of the Public Safety Network. The renewal of the state contracts for data communications services in the fall of 2004 represents an important

opportunity. It is an opportunity to re-evaluate state needs. It is also an opportunity to leverage the state's power as a customer for the public interest.

The upcoming request for proposals also coincides with upcoming changes in communications for education. Under the five-year Verizon alternative regulation plan, Verizon has provided to high schools in its territory at no charge the high-speed links needed to create the Interactive Learning Network (ILN), the videoconferencing network managed by the Vermont Institutes. Verizon's subsidy for this network is due to expire before the end of the 2004-2005 school year. While the ILN is an Internet Protocol (IP)-based network and is compatible with delivery of Internet traffic as well as video, the terms of the plan did not allow the ILN to be used for purposes other than education-related videoconferencing. While the end of the plan presents a serious funding problem for the ILN, it also removes these restrictions. The Vermont Institutes have announced that one option under serious consideration is conversion of the ILN into a statewide wide area network for schools that would offer videoconferencing and Internet access integrated together. Schools would buy services together from private vendors. At the same time, the DII and the previous state office of the Chief Information Officer (CIO) have for a number of years offered Internet access to schools as K12Net, under the umbrella of GOVnet. K12Net was first conceived when options for Internet access were few and expensive. As time has progressed, schools have had more choices of Internet Service Providers (ISPs) and have tended to drift away from K12net (although many remain). The creation of the DII, as well as the forthcoming state Request for Proposals (RFP) for connectivity including K12Net, provides an ideal opportunity to re-examine the role of the state in providing Internet access to schools and the opportunities for providing videoconferencing to state offices.

Policies

▶ Except for those instances when there are overriding issues of public safety or security, state government should favor the use or creation of open networks above networks that only state government or elements of the public sector are allowed to use. This may take the form of

  • State use of common-carrier services; or

  • State use of state-owned networks or facilities that are open on reasonable terms for use by common carriers to serve the public.

▶ The DII should structure RFPs for data communications connectivity to explicitly enable smaller vendors the opportunity to bid for a fraction of the state's data connectivity needs, or the state's needs in a particular region. It should not guarantee that the state will not choose a very small number of vendors to supply its data communications needs or choose a vendor or vendors to serve its needs on a statewide basis.

▶ The state should try to use its purchasing power and excess capacity on networks it owns to promote improvements in telecommunications infrastructure, services, and prices, especially in unserved or underserved areas of the state.

  • The state should focus on locations, services and infrastructures that have limited choice of providers or services for consumers, and avoid intervening in markets where there is robust competition.

➤ The DII should seek to engage the telecommunications purchasing managers at other important buyers of telecommunications services on an ongoing basis. This should include entities such as colleges, schools, major businesses, and hospitals and health care networks. With these partners, DII should seek to identify opportunities to coordinate purchases of telecommunications services for mutual benefit or to help improve telecommunications in the wider community.

Strategies/Action Plans

➤ The DII and the Vermont Institutes should collaborate to produce a combined successor network (the "Educational Communications Network") to both K12Net and ILN by the 2005-2006 school year.

- The Educational Communications Network should contract for wide area networking and Internet access in conjunction with state government.

- The Educational Communications Network should offer schools security, filtering, e-mail, hosting, and videoconferencing through the network. The network should solicit and consider bids by outside vendors to provide these services.

- The Vermont Institutes should offer information, support, and training to schools on the use of technology in education in conjunction with the network.

➤ The Educational Communications Network should make available ILN-style conference-room based videoconferencing for state office buildings at cost.

➤ The state should make open space located in strategically located state buildings available to telecommunications service providers when doing so will enable telecommunications vendors serving the state to offer better or less costly data telecommunications services to unserved or underserved communities.

➤ The DII should issue a Request for Information (RFI), and an RFP (if warranted), for a contract for broadband services to the home for state agencies with telecommuting employees that can also be offered by the vendor to state employees.

STATE VOICE COMMUNICATIONS

In all likelihood, the day is approaching when the state will have the opportunity to use a voice telephone system that rides over a data network. The emergence of voice as just another data application, promises opportunities to increase the flexibility of the state's voice services. For example, it may be easier to provide custom calling features to state employees, re-arrange phone systems, and integrate computer and phone networks. The state may also be poised to save money or improve telecommunications service in the future by operating a single voice and data network instead of separate voice and data services. It is too early to determine the optimum system for the state and whether it is best for the state's voice services to ride over a data and video network operated by the state or that of a service provider offering voice service over a converged network. Nevertheless, there are new opportunities becoming available for state government in the provision of voice services.

Policies

▶ DII should continue to review new voice technologies as they mature and standards become firm.

▶ The state should continue to maintain a voice communications system that provides relatively low cost at high value to the enterprise. The state should seek to balance lowest cost with features that enhance the productivity of state workers and improve service to the public, not allowing either one to become a concern to the exclusion of the other. The state should seek to establish a long-term technology migration path, while allowing enough flexibility to adjust to technology developments.

Strategies/Action Plans

▶ The state should seek out telephone services that, when required, can be integrated with and complement other communications-related applications, including website applications, e-mail, instant messaging, wireless telephone service, electronic contact databases, and remote access.

▶ The DII should plan for an eventual migration to packet-data voice services, contingent on cost and value factors. It should establish a migration path over the next three to five years. It should take steps now as opportunities present themselves to facilitate a smooth migration, either sooner or later, as appropriate.

▶ When selecting a voice service supplier, the DII should evaluate the costs of operating separate voice and data services/networks vs. the costs of operating a converged voice, video and data network.

▶ When selecting a telephone service supplier or suppliers, the DII should evaluate options for both buying services (e.g. Centrex) and operating equipment (e.g. PBXs or softswitches) and include in the evaluation the long-term costs of each option.

STATE MOBILE COMMUNICATIONS

The DPS operates the most far-ranging public-sector mobile communications system in the state. It not only serves the State Police and Vermont Emergency Management but thirty state, federal and local agencies and organizations. Vermont's existing, analog, public safety radio communication system is under the pressures of aging technology, increasing service demands, inadequate coverage, channel congestion, interference, and a dramatically changing wireless communications environment. The first part of the DPS's transition plan, the $8 million upgrade to the microwave backbone, has been successfully completed. A second, larger, upgrade has been deferred for many years. To improve interoperability and to promote efficient communications within consoli-

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VoIP and Wireless Internet:
New York's 9/11 Experience

❚❚ [New York City's Department of Information Technology and Telecommunications] also relied heavily on Internet telephony to provide voice communications. Internet telephony allowed users of specific phone lines to move from location to location as needed, without changing phone numbers. City Hall's phone service was provided through the Internet for weeks after the attacks; workers simply plugged their phones into any available Internet jack.

"DoITT also used high-speed wireless transmitters to connect various other local government buildings to the City's network. At a cost of approximately $38,000 each, City Hall, the Municipal Building, and the City Council at 250 Broadway, were all reconnected to the Internet by wireless transmitters quickly plunked on top of their respective buildings."—*Homeland Defense Journal* July 2003, p.37.

dated dispatch centers, a new digital radio system is needed. A radio system that allows for mobile data technology and trunking technology is the system of choice. (See sidebar, "The Advantages of Trunking.") Some of the operational requirements for a new radio system include:

▶ Reliability. Emergency service providers depend on a system that is operational 24 hours per day, 365 days per year. Radio communications provide the only lifeline to dispatcher or back-up assistance in emergencies.

▶ Interoperability. Increased complexity, size and frequency of emergency incidents are raising the requirements for coordinated multi-agency and multi-state responses. Interoperability is fundamental to a coordinated emergency response. Current solutions to interoperability involve allowing local emergency responders to program State Police frequencies into their radios to use only in special emergency situations. This is only a band-aid and does not offer the interconnection flexibility of a trunked radio system.

▶ Improved Coverage. The current radio system was not designed to provide full state radio coverage. At the time it was designed it did not include portable (handheld) radio coverage. The current needs of law enforcement require a greater coverage area and portable radio coverage, not merely coverage using vehicle-based systems.

▶ Mobile Data. Mobile data is needed to afford law enforcement a greater opportunity for real time data in their vehicle. Data in the field can provide officers with needed information in a timely fashion and increase the amount of time an officer can spend in the field. Mobile data could reduce voice traffic and lighten dispatcher workloads as voice systems are often used to relay data that an officer might be able to access directly if a mobile data system were in place. Furthermore, it is possible that during the planning window for this project, it may become feasible and desirable to combine voice and data networks into a single mobile data network that supports digitized voice communication as one application on the data network.

Joint state and federal support have worked together in the past to upgrade the network. Recent federal support included approximately $4 million for the upgrade of the backbone and $1.4 million for mobile data upgrades. While the backbone upgrade has been completed successfully, the funding to date for the mobile data project will only allow the state to achieve a limited trial or partial upgrade. A 1998 preliminary estimate by the DPS of the cost of a statewide digital mobile network upgrade put the cost of the project at $20 million. An exact figure is hard to calculate reliably without a planning and design study.

The Advantages of Trunking

Used for many years by the wireline telephone industry, trunking technology was first applied to wireless communications in the 1970's. Trunking technology was developed specifically to increase communications and spectrum efficiency. A trunked system supports a larger number of users on a group of radio channels, achieving spectrum efficiency through channel sharing. Much like the classic image of a switchboard operator, when a user wishes to make a call, the system automatically selects an available channel from a pool of frequencies. As a result, all users have automatic access to any available channel, reducing the wait time for a channel. Trunked radio systems are ideally suited to meet the needs of wide area or multi-agency systems. Trunking provides autonomy of communications for each agency, but supports direct interoperability when desired.

Furthermore, a project that is designed to cover only the mobile communications needs of the State Police misses a vital opportunity. Local police, fire, rescue and other agencies will also be facing the need to upgrade systems over the next decade. A statewide trunked radio system serving state government users plus local and federal users can accomplish a major goal of homeland security and emergency response—it can provide multiple agencies with their own communications capacity while linking those users as needed. While an expanded system could be up to several times more expensive than a system designed primarily for the State Police, depending on the number of users and extent of local coverage, it is likely to be less expensive and more useful than dozens of separate uncoordinated projects.

Finally, although the needs of public safety users must be given top priority, an upgrade to the public safety network provides opportunities to support the goals found elsewhere in this plan of improving commercial wireless service. There may be benefits for both state government and commercial providers. To the extent that a new network may require new or rebuilt tower structures, there is an opportunity to work with private providers up front to plan for new or enhanced collocation opportunities and cost sharing. Furthermore, there may be opportunities for the state to reduce its need to construct a completely separate mobile communications system, especially for mobile data, by contracting with a private wireless service provider. Such a relationship would put the state in a position to demand quality of service and coverage standards that could improve the service available to the general public in Vermont.

Policies

▶ As a high priority, the state should seek to include local government and federal users voluntarily in an integrated trunked mobile radio system and discourage the deployment of non-interoperable systems in Vermont.

▶ The state should evaluate both building vs. buying mobile radio services when considering what path to take for a state mobile network upgrade. It should evaluate both kinds of alternatives on their cost and ability to assure acceptable and desired levels of performance, security, coverage, and reliability.

▶ In developing a mobile radio system upgrade, the state should communicate with commercial wireless service providers and take advantage of all practicable collocation opportunities.

▶ The state should not shy away from developing new tower sites if a lack of otherwise available and practical sites prevents meeting goals of improved public safety communications. It should minimize the cumulative aesthetic impact of a new network, especially by minimizing the number of new sites and the number of sites used only by public safety users.

Strategies/Action Plans

▶ The legislature should make a multi-year capital commitment beginning in fiscal year 2005, if possible, to the upgrade of the public safety mobile communications system to enable proper planning, engineering, and timely implementation of a design. If one-time money becomes available in the

state budget, a major one-time infusion to the communications system should be a high priority.

- The first step should be funding a needs assessment, planning, and engineering study that will identify the potential willing users (including local users) of the system, identify the specific needed services for those users, develop a needs assessment, and a design for the project. The state should be prepared to spend several hundred thousand dollars on this phase of the project.

- Once funding is in place for the study, the state should establish a user group that includes local users to guide and assess the work of the consultant.

- The state should seek completion of a new mobile radio system within 5 years of initial funding.

▶ Vermont's Congressional delegation should make a major earmark in support of the upgrade or similarly available funding a priority.

TELECOMMUTING IN STATE GOVERNMENT

"[T]elework is here to stay… its not just a perk or special privilege, its an opportunity to increase employee morale and increase the attractiveness of working for the federal government."—Kay Coles James, Director U.S. Office of Personnel Management on www.telework.gov

Telecommuting (or "telework") is a mature, mainstream, application of telecommunications that can help state government meet its goals in a variety of ways. The Institute for Distributed Work has forecasted that corporate employees working outside the office at least two days per week will rise to 13.7 million by 2005, a figure that equals 9.2% of the workforce and which is up from 6.3 million in 1995.[1] A 2001 telephone survey by researchers at Old Dominion University found that about 20% of the U.S. workforce age 18 or older do some type of telework, either at home, at a satellite office or telework center, or on the road.[2] Common reasons that employers will institute telecommuting programs are real estate savings, increased employee productivity, and an ability to attract and retain qualified employees.[3] AT&T, which has conducted statistically valid research of its own teleworking employees since 1992, found that teleworking managers have 7.4 productive hours per day, compared to only 6.7 productive hours per day for the general population of managers.[4] Telecommuting works best when it is done as part of a structured program. Fortunately, there are many examples of state and federal programs to promote successful telecommuting, both in the public and private sector workforces. At least fourteen states, the District of Columbia, and the federal government have programs to implement or encourage telecommuting.

Strategies/Action Plans

▶ Vermont state government should develop appropriate support structures for telecommuting by state government employees. Telecommuting should be supported in situations where it offers benefits for employee retention, satisfaction, and productivity. Telecommuting should be encouraged where it offers additional benefits for the state government enterprise.

▶ The Department of Personnel should develop policies, standards, and a training program for managers in identifying appropriate employees for telecommuting, and techniques for successfully managing telecommuting. These should draw upon best practices of successful telecommuting programs of other government and private-sector organizations.

▶ The Department of Personnel should develop guidelines for use of private office equipment, use of private phone and Internet services, and procedures for employer-requested telecommuting and employee-requested telecommuting arrangements.

▶ The DII should implement an enterprise instant messaging system for state government that can be used by telecommuting state government employees and employees in the office.

Planning and implementing a telework program
The J.D. Edwards experience

In 1998 a small group of executives decided that J.D. Edwards would benefit from formalizing a telework program. Up to that time this was done on an ad-hoc basis, with each department developing their own guidelines and policies. They wanted to develop a program consistent company-wide, and decided a person to oversee the program was critical to its success. Wanda Brackins was hired in February 1999 to implement and manage the telework program.

First, she put together a project team. Members included representatives from IT Remote Access, IT PC Support, IT Voice Services, IT Help Desk, IT Security, Procurement, and Legal (in addition to Wanda). Their first task was to document what was being done in various departments. By April they had information on existing practices. From that developed company-wide standard criteria and policies. These were submitted for executive review and approval. Having top management pushing for a formal program made this much easier.

Next, they researched potentially sticky issues through site visits and the experience of telework managers. They held a few focus groups with existing teleworkers. They then focused on the identified problem areas. One of the most difficult issues was (and is) connectivity. If an employee's job requires a high-speed connection, then it must be available at their home for them to be eligible for telework. (The CIO noted that providing connectivity is the most problematic ongoing aspect of the telework program. Each home office is unique.) Employees were eager to participate in the telework program, managers less so. They were given training on how to manage remote employees and encouraged to consider telework for their workers.

They put together equipment guidelines so that there is some standard (making support easier) set of equipment and procedures in place to help set up the PC a worker takes home. Early teleworkers sometimes complained of down time in getting a PC set up for use at home. They developed procedures for handling PC problems so that a worker would have minimal time without a PC. Initially, workers had to ship a failed PC and get a loaner, often causing extended downtime. Now they sub-contract with the Whitfield Group, which will go to the worker's home to fix certain classes of problems.

They developed "quick guides" for existing remote workers. (They identified about 200 teleworkers, including sales and pre-sales positions.) The rollout of the new program was done in late August of 1999. During the 4 to 5 months that followed, they attended meetings at the Senior VP (Executive) team and VP/Director levels to present an overview of the program, policies, and guidelines, giving the "why's", goals, and their responsibilities.

Originally there were four parts to the teleworkers' training - given by IT Security, IT Remote Access, PC Support, and Wanda (for HR) on guidelines, etc. Now there are two presenters - Wanda and IT Remote Access (troubleshooting information included).

They developed a handbook, originally hard copy, now on line. They send out notices (included in the twice-a-week corporate newsletter) whenever there are substantive changes. The handbook information was presented in three stages - to the mangers with remote workers (information included a table comparing what was vs. current, with the "why's" to the changes). A week later they sent the information to all remote workers. Finally, they included the information in the company newsletter.

When someone officially starts telework, this is recorded in the company employee records so that Wanda has access to accurate lists of teleworkers (facilitating contact with them) and can gather performance statistics.

The project team still meets on a regular basis. Previously they met monthly, now they meet every two months. The involvement of Legal has waned from their initial involvement, as there is little ongoing need for their input.

(Excerpt from Vermont Telecommunications Advancement Center's report "A Work at Home Project for Rural Vermont," June 2003.)

▶ The DII should continue to support options for remote access to office networks by virtual private networks or comparable technology. In addition, the DII should establish one or more supported ways for remote access to state voice telephone service, including possibly a voice-over-IP gateway.

TELECONFERENCING SYSTEMS

Teleconferencing encompasses the range of video and voice systems that allow multiparty meetings, classes, hearings, and other forms of interactive communication over distance, and the tools of real-time collaboration over computer networks. Teleconferencing is in the process of moving out more and more on to desktop computers. At the same time, the Internet and IP are becoming more and more capable of handling real-time applications like voice and video. Teleconferencing includes, but is not limited to, "videoconferencing." Increasingly, it also includes the ability to support multimodal collaboration, sharing computer applications, and documents. (See "The Future of IP Teleconferencing" sidebar.) This diversification and diffusion of teleconferencing technology has significant implications for Vermont's established videoconferencing systems—Vermont Interactive Television (VIT), the Vermont Interactive Learning Network and UVM's Distance Learning network, and it opens up new opportunities in state government.

VERMONT INTERACTIVE TELEVISION

VIT's largest group of users is the educational community, although it also serves government and private users, all on a fee-for-service basis that varies by type of user. (Additional support is provided by legislative appropriation.) VIT has the advantage of being a mature, stable system that provides users with a managed videoconferencing environment—staff is on hand at each VIT site to operate equipment and make the system easy to use for even novice or infrequent users. It also has an established system in place for scheduling users at sites and billing. VIT has limits. As currently implemented, it would be very expensive to increase the number of VIT-type sites in Vermont by a significant number. While users may not often travel as far as they might otherwise when they use VIT, they often do travel. VIT's full schedule and billing structure lends itself more to pre-planned events than to ad-hoc meetings between a few individuals.

VIT's value lies partly in its technology and partly in its administrative support structure. The day is likely coming when the need for VIT's technology will be eclipsed as the options for doing desktop and conference-room teleconferencing become less expensive, more robust, and easier to use. In light of this trend, it is not advisable to make a major investment to convert a network like ILN, with more than four times the sites, to the technological and service standards of a VIT site. (Increased interconnection and interoperability is another matter.) In the meantime, VIT can play an important role in its existing form to provide videoconferencing capability to those populations that cannot yet support it on their own. Circumstances may support some limited expansions of the legacy VIT network, but technology is providing other options for many videoconferencing applications. Beyond the technology, the institutional ability of VIT

to manage sites for outside users, schedule events, and interconnect is itself a resource that other public-sector partners should try to leverage and not to duplicate. If VIT can act as a catalyst to link together different users with a range of videoconferencing options, it can continue to add value even without adding sites.

Policies

▶ Other publicly supported videoconferencing systems, especially the ILN and UVM's Distance Learning Network (DLN), should not seek to duplicate VIT's administrative infrastructure for centrally managing a statewide set of videoconferencing sites for use by the public.

  • VIT should support requests by other Vermont teleconferencing systems to perform, at cost, scheduling, site management, business functions, data management and analysis, marketing and public relations, and long-term facility planning, coordination, and standards as requested.

Strategies/Action Plans

▶ VIT's system should be maintained for the near future at least. Expansion by means of interoperation with existing videoconferencing systems such as ILN and DLN is supported, as are expansions that could be supported on the basis of additional revenue generated by users of the system.

▶ Establishment of a Montpelier VIT site as soon as possible should be a VIT and state government priority.

▶ Although it may be convenient to continue to house VIT in the Vermont State Colleges, VIT should take steps to increase perception of the organization as a more universal teleconferencing resource. The Commissioner of Information and Innovation or his or her designee should be a standing member of the VIT coordinating council and should play an active role in governance.

▶ VIT should seek to nurture and leverage expertise in the effective deployment and use of teleconferencing technology. State support of VIT should include a responsibility to advise and assist state government through the DII in the selection, deployment, and support of teleconferencing and video streaming technologies.

The future of IP teleconferencing

IP conferencing improves worker productivity. Workers that use conferencing and collaboration will employ an interface that seamlessly extends across IM, voice and videoconferencing for both ad hoc and scheduled conferences. IP conferencing will provide workflow efficiencies for scheduling and joining conferences, and will enable more effective spontaneous communications through multimodal, rich-media, ad hoc conferencing.

Users will be able to initiate and control conference calls in various ways, including the "voice first" or 'text first" paradigm. Using an IP phone or an IM service, workers will establish a connection with a remote colleague, and then using intelligence built into the conferencing infrastructure, decide to add other associates or co-workers and/or expand the conference to include other media types as required.

On a pop-up screen, the user will click on the participants to include in a conference, then select the media types appropriate for the conference— video, audio and/or data collaboration. The network will then seek out and find those users (using presence technology), determine which device the user is on, and which media types the device can support; then it will set up the required conference resources (bridges and connections) automatically—transparent to the worker who initiated the call.

Conferencing will no longer be a "this or that" endeavor—a choice to use one media type or another, or to enable ad hoc calls but with limited functionality. Instead, it will become a dramatic telephony enhancement—an extension of the intelligent network that seamlessly locates, facilitates and enables media-rich conferences.

--Communications News, "The Future of IP Conferencing," October 2003, p. 31.

- ▶ VIT should continue to develop and promote gateways for interoperating with Internet-based videoconferencing systems.

- ▶ VIT should offer live and archived Internet video streaming of VIT sessions as a service and should seek to make available fee-based Internet video streaming services to Vermont organizations, either directly or through a third party.

- ▶ VIT should post real-time or near real-time conference room availability to the web and should work with the DII to develop automated on-line booking of conferences as an e-government application integrated with the state portal.

- ▶ Other than the types and examples of expansion discussed here, expansion in the number of VIT sites using its present form of videoconferencing should not be a state funding priority. Furthermore, at such time in the future when a high-quality, user-friendly, IP-based videoconferencing on the desktop or in the conference room/classroom becomes widespread in its availability and use in Vermont, this will signal the end of the need of ongoing state support of the network in its current form.

VERMONT INTERACTIVE LEARNING NETWORK

ILN serves the high schools (and a limited number of other sites), primarily in support of secondary education. Using a different videoconferencing technology than VIT that is IP-based, ILN links dozens of sites on the network via a video bridge in Montpelier. Unlike VIT, where staff actively manages the conference at each site, using ILN is more like making a high-quality videophone call on a private phone network. Although the system is technically capable of transporting Internet traffic, its use has been limited by the terms under which it has been created and supported: the connectivity has been provided at no charge by Verizon under the terms of its 5-year alternative regulation plan, but only for the educational videoconferencing purpose for which it was created. This plan and the support for ILN expire in the first part of 2005.

Strategies/Action Plans

- ▶ At the end of the current Verizon alternative regulation plan, ILN should discontinue as a separate videoconferencing network and operate on a fee-for-service basis as part of an IP-based integrated voice/video/data wide area network with Internet access.

- ▶ The Vermont Institutes should promote the development and interconnection of high-speed wide area networks linking Vermont schools with bandwidth capable of flexibly supporting reliable collaborative applications between Vermont schools.

STATE GOVERNMENT TELECONFERENCING

Videoconferencing, primarily VIT, has been seen by some in state government as a tool to reduce travel by state employees and promote greater access by the public. The state has had a measure of success in each of these areas using technologies implemented to date. As noted above, teleconferencing is developing in ways that will allow new, more convenient opportunities for collaboration over distance without travel. Over the next 3-5 years it should be the vision of

the state to use emerging teleconferencing tools to enhance and improve on the telephony tools currently available to state employees. The state should use tele-conferencing technologies as a tool for breaking down inter-agency barriers and enabling collaborative work across the state government enterprise.

Strategies/Action Plans:

▶ The DII should identify at least one or more desktop teleconferencing programs it will support on Wide Area Networks and provide information and support to network managers for the successful integration of these programs into state office networks and Virtual Private Network (VPN) access. This should include how to deal with security issues.

PRIVACY OF ELECTRONIC INFORMATION

The push for e-government is important for improving efficiency in government and providing the public with better and more convenient services. E-govern-ment also involves increasing amounts of information stored and transmitted in electronic form. This makes it easier to collect, store, manipulate, and transfer information. The use of electronic information in government raises reason-able concerns about privacy and confidentiality of information held by state government about Vermonters. Various state government agencies will also need to cope with federal privacy requirements, such as those of HIPAA (the Health Insurance Portability and Accountability Act of 1996) in health care and the Gramm-Leach-Bliley Act in financial services. The state must also consider the privacy implications of state employee information in elec-tronic form. Issues of privacy of electronic information in state govern-ment can be addressed successfully, and the creation of DII provides a new focal point for these efforts.

Policies

▶ Every electronic information asset in state government should have a set of privacy practices associated with it.

Strategies/Action Plans

▶ The state's Information Resource Management Advisory Council (IRMAC) should develop a recommended statewide privacy policy in 2004 and report to the Commissioner of Information and Innovation.

- The Department of Personnel should advise the Commissioner of Information and Innovation on privacy issues related to state employees and the state's union contracts.

- The Commissioner of Information and Innovation should accept or modify the IRMAC privacy policy as warranted.

▶ Once a privacy policy is in place, the DII and other state agencies should undertake a privacy audit of state electronic information assets.

▶ The state should use digital signatures whenever applicable to protect privacy.

- DII should seek funding sources to support use of digital signatures in state government.

What is a digital signature?

Digital signatures are an applica-tion of encryption technology used to scramble a file or message so as to secure it, such as when it is being sent from one party to another. A digital signature uses a "private key" that allows one party to scramble and "sign" an electronic document and a "public key" to allow intended recipients to unscramble the message and verify the sender's iden-tity.

(Endnotes)

[1] Shellenbarger, Sue, <u>Wall Street Journal</u>, "'Telework' is on the Rise, but It Isn't Just Done from Home Anymore." January 23, 2002, p. B1.

[2] Davis, Donald D. and Karen A. Polonko. "Telework America 2001 Summary." http://www.telecommute.org/telework/twa2001.htm.

[3] Vermont Telecom Advancement Center, "Work at Home Project for Rural Vermont," a report to the US Dept. of Agriculture, June 2003, p. 48.

[4] Roitz, Joseph, Brad Allenby, Robert Atkins. "2001/2002 Employee Survey Results: Telework, Business Benefits, and the Decentralized Enterprise." (2002) AT&T.